

# Single-Frequency Semiconductor Lasers Operating at 1.5 and 2.0 microns, Phase II

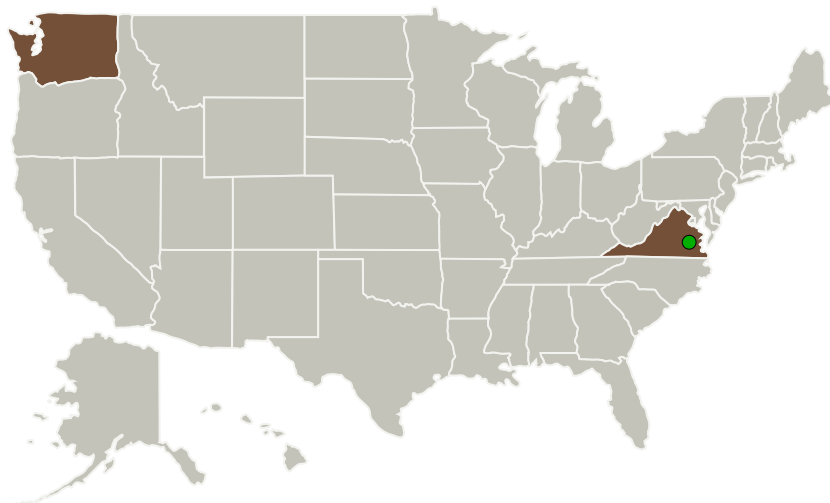
Completed Technology Project (2010 - 2011)



## Project Introduction

While conventional injection seeding sources (such as DFB diode lasers and rare-earth doped solid-state microchip lasers) are available at 1.5 microns, these sources typically lack the ultra-narrow (<50 kHz), ultra-stable output spectrum required for use in applications such as Doppler shift measurements of the tropospheric winds. Furthermore, similar sources which operate at 2.0 microns (a preferred wavelength for space-based atmospheric measurements) are simply unavailable. Based on promising results obtained under NASA Phase 1 SBIR funding, nLight proposes the parallel development of 1.5 and 2.0 micron injection seeding sources based on our well-established, wavelength-scalable, industry-leading InP semiconductor laser design. Optical feedback provided by external volumetric or fiber Bragg gratings serves to narrow the semiconductor linewidth to the appropriate level. If necessary, further linewidth reduction can be achieved by means of electronic feedback circuitry. The line-stabilized diode lasers will be integrated with nLight's exiting space-qualified (space flown), hermetically-sealed, compact single-mode diode package, efficiently coupled to single mode fibers, and delivered to NASA.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
nLight Photonics Corporation	Lead Organization	Industry	Vancouver, Washington
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Virginia	Washington

## Project Transitions

**March 2010:** Project Start**December 2011:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139454>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

nLight Photonics Corporation

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

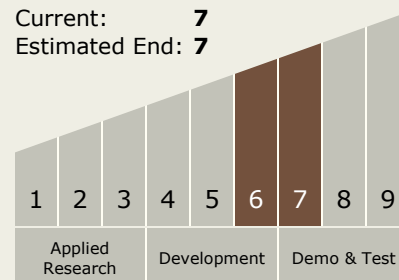
Carlos Torrez

**Principal Investigator:**

David Balsley

## Technology Maturity (TRL)

Start: 6  
 Current: 7  
 Estimated End: 7



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## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.5 Lasers

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System